Effect of Number of Washing on the Characteristics of Copper Oxide Nanopowders

ABSTRACT

The effect of washing on physico-chemical properties of copper oxide prepared via precipitation method was investigated by means of X-ray diffraction (XRD), Fourier transform infrared (FTIR), BET surface area measurement and scanning electron microscopy (SEM). Increasing the number of washing has successfully removed undesired nitrate resulting in high surface area CuO catalysts from 8.5 to 15.9 m2 g-1. XRD pattern of these oxides gave well crystalline of CuO with main peak appeared at 2q = 35.5°, 38.7° and 48.7°. The powders obtained are of uniform size distribution, finely grained with an average size of 20 nm. In addition, an investigation on the mobility of oxygen species carried out using transient technique i.e. temperature programmed reduction (TPR) shows that reduction peak maximum moved towards lower reduction temperature with the increasing number of washing. This indicates the ease of reducibility of the oxide when the precursor is washed several times. It is clearly found that particle size was profound effect on the catalytic activity of CuO.

Keyword: copper oxide, precipitation method, effect of washing, TPR, reduction